Konarka

Sukant Tripathy

Sukant Tripathy, Professor at the University of Massachusetts Lowell, died on December 12, 2000 in a swimming accident in Hawaii after lecturing at a conference of the Polymer Chemistry Division of the American Chemical Society.

Sukant was born in Bihar, India, and he did his undergraduate work at the Indian Institute of Technology at Kharagpur. He received his Ph.D. in polymer science from Case Western Reserve University in 1981, and then joined GTE Laboratories. At GTE Labs, he became manager of the organic and polymer science department.

In 1985, he joined the chemistry faculty at the University of Massachusetts Lowell. He founded and served as director of the Center for Advanced Materials from 1992. He also served the University as provost and vice chancellor for academic affairs from 1994 to 1996.

Sukant Tripathy was recognized around the world for his research in thin polymer films and their electrical and linear and nonlinear optical properties. In 1993, he was awarded the Carl S. Marvel Creative Polymer Chemistry Award of the American Chemical Society Division of Polymer Chemistry. He had published more than 200 papers in the areas of interest and held two dozen patents.

https://www.tandfonline.com/doi/abs/10.1080/10601320802391015?journalCode=lmsa20

Journal of Macromolecular Science: Tribute at ten years after his death

Sukant Tripathy

Editorial and in Memoriam

Russell A. Gaudiana

Pages 881-883 | Published online: 19 Nov 2008

It seems impossible that it has been ten years since death in December of 2000 and that this is the tenth symposium in his honor. Over the years •we have had many excellent speakers, nearly all of whom have taken time to write their presentations for this Special Issue of the Journal of Macromolecular Science. This year is no exception to that tradition since nearly all presenters have contributed a manuscript to the Special Issue.

My own presentation at the symposium highlighted the nearly ten year developments of the company Sukant, along with Howard Berke, was in the process of establishing when he died

The name of the company is Konarka Technologies. My role in the company is the Vice President of Research, and I have been with Konarka since its founding in 2001. In addition to Howard and Alan Heeger , friend and colleague or Sukant). four of Sukant’s closest associates, namely, Professor Jayant Kumar (former classmate and close friend). Drs. S. Balasubramanian, K. Chittibabu, and L Li (all of whom are former doctoral students of Sukant and Jayant) are also co-founders or the company,

The name or the company was suggested by Sukant's: wife Susan Tripathy. Konarka (or Konark) is a temple in Orissa, India. dedicated to the Hindu sun god Surya. Because Sukant visited the temple whenever he returned to his childhood home, everyone thought that this name for the company would be very appropriate.

Konarka was founded on the idea that an easily installed, inexpensive roof-top or portable power producing solar module would find widespread utility and acceptance in rural locations. Rural villages producing their own power would be a significant societal benefit to millions of people living in third world countries where grid power is non-existent.

In order to keep materials and manufacturing costs 10 a minimum, we had to use an appropriate photovoltaic technology which we decided would be either dye sensitized;

It seems impossible that it has been ten years since Sukant's death in December of 2000 and that this is the tenth symposium in his honor. Over the years we have had many excellent speakers, nearly all of whom have taken the time to write their presentations for this Special Issue of the Journal of Macromolecular Science. This year is no exception to that tradition since nearly all presenters have contributed a manuscript to the Special Issue.

My own presentation at the symposium highlighted the nearly ten year developments of the company that Sukant, along with Howard Berke, was in the process of establishing when he died. The name of the company is Konarka Technologies. My role in the company is the Vice President of Research, and I have been with Konarka since its founding in 2001. In addition to Howard and Alan Heeger (a friend and colleague of Sukant), four of Sukant's closest associates, namely, Professor Jayant Kumar (former classmate and close friend), Drs. S. Balasubramanian, K. Chittibabu, and L. Li (all of whom are former doctoral students of Sukant and Jayant) are also co-founders of the company. The name of the company was suggested by Sukant's wife Susan Tripathy. Konarka (or Konark) is a temple in Orissa, India, dedicated to the Hindu sun god Surya. Because Sukant visited the temple whenever he returned to his childhood home, everyone thought that this name for the company would be very appropriate.

Konarka was founded on the idea that an easily installed, inexpensive rooftop or portable power producing solar module would find widespread utility and acceptance in rural locations. Rural villages producing their own power would be a significant societal benefit to millions of people living in third world countries where grid power is nonexistent.

In order to keep materials and manufacturing costs to a minimum, we had to use an appropriate photovoltaic technology which we decided would be either dye sensitized

https://en.wikipedia.org/wiki/Konarka_Technologies

Konarka Technologies, Inc. was a solar energy company based in Lowell, Massachusetts, founded in 2001 as a spin-off from University of Massachusetts Lowell. In late May 2012, the company filed for Chapter 7 bankruptcy protection and laid off its approximately 80-member staff. The company's operations have ceased and a trustee is tasked with liquidating the company's assets for the benefit of creditors.[1]

The company was developing two types of organic solar cells: polymer-fullerene solar cells and dye-sensitized solar cells (DSSCs). Konarka cells were lightweight, flexible photovoltaics that could be printed as film or coated onto surfaces.

The company had hoped its manufacturing process, which utilized organic chemistry, would result in higher efficiency at lower cost than traditional crystalline silicon fabricated solar cells. Konarka was also researching infrared light activated photovoltaics which would enable night-time power generation.

The company's co-founders included the Nobel laureate Alan J. Heeger. [2] The company was named after Konark Sun Temple in India.

As of 2006, Konarka had received $60 million in funding from venture capital firms including 3i, Draper Fisher Jurvetson, New Enterprise Associates, Good Energies and Chevron Technology Ventures.[3] Konarka also received nearly $10 million in combined grants from the Pentagon and European governments, and in 2007 was approved for further funding through the Solar America Initiative, a component of the White House's Advanced Energy Initiative.[4] The company raised a further $45 million in private capital financing in October 2007 in a financing round led by Mackenzie Financial Corporation.[5]

The company also received $1.5 million from a state of Massachusetts alternative energy trust fund in 2003 during Governor Mitt Romney's term and another $5 million during Governor Deval Patrick's term. At the time of its bankruptcy filing in 2012, its funding history was summarized: "Konarka raised more than $170 million in private capital investments and $20 million in government grants, according to its website. Under the Bush administration, Konarka received a $1.6 million Army contract in 2005 and a $3.6 million award from the Department of Energy in 2007. Under the Obama administration, Konarka was one of 183 clean-energy companies that got a total of $2.3 billion in tax credits as part of the 2009 stimulus."[6]

http://www.bostonglobe.com/business/2012/07/07/why-did-solar-cell-company-konarka-fail/tDEdGzmMQO6nNF55RfjvNJ/story.html?p1=Article_Recommended_ReadMore_Pos14

Boston Globe

INNOVATION ECONOMY

Why did solar cell company Konarka fail?

Bic Stevens can remember his first glimpse at some dazzling solar power technology developed at the University of Massachusetts Lowell back in 2001. Scientists had produced a "little quarter-sized solar cell, entirely out of plastic, and it made a little propeller go," Stevens says. The appeal of a "dirt-cheap," pliable, and easy-to-manufacture solar material was that almost anything, from the roof of a bus to the top of an Army tent, could start generating electricity from the sun.

Stevens put the first $50,000 into creating a company that would commercialize the UMass research, and helped recruit a Nobel prize winner in chemistry to advise the new venture, Konarka Technologies. (The company was named after a temple in India built to honor the sun god Surya.)

……

Over the next 11 years, Konarka raised $170 million from private investors including Chevron Corp.; secured millions in grants, tax credits, and loans from Republican and Democratic administrations in Massachusetts and Washington; bought an old Polaroid plant in New Bedford to make its "Power Plastic"; hired and then laid off 100 employees; and filed for bankruptcy protection in early June.

…

Konarka's chief executive, Howard Berke, was a serial entrepreneur who'd previously been involved with videoconferencing and medical imaging companies. 38 Studios was banking on a Hollywood-style blockbuster.

Konarka was applying brainpower to bring a scientific breakthrough to market.

So what happened at Konarka?

……

But, says Dan Roach, an early Konarka employee, “the unanswered question was always how efficient the product would be” — that is, how much of the available sunlight could it turn into electricity?

Another issue was how long Konarka’s Power Plastic would last, since plastic tends to degrade in sunlight. “If there was a case study written about Konarka,” says Roach, “it might say that this left the academic lab too early. A lot of the venture capital money was spent doing research, and not developing the product.”

While the Army tested Konarka materials for use atop tents, and the company pitched a transparent version of Power Plastic for use on buildings’ windows, only two products ever saw the light of day. One was a $180 messenger bag, made by a German retailer, that used Konarka material on the front flap to recharge digital cameras and mobile phones inside. And an Australian company called Sky Shades put Konarka’s material on top of a $10,000 patio umbrella, the SolarBrella, which could supply juice to laptops and other portable electronics. Konarka’s factory in New Bedford was largely idle.

…..

During this year’s presidential contest, Mitt Romney will no doubt be asked about the $1.5 million grant the state gave Konarka in 2003, when he was governor.

And his successor, Deval Patrick, will most likely lose $3.3 million in taxpayer money that his administration lent Konarka to set up its New Bedford plant. Both governors clearly envisioned that a solar material that could be plastered on just about anything would create plenty of jobs in the state.

http://www.forbes.com/sites/petercohan/2012/06/05/konarka-mitts-bankrupt-solar-bet/

Konarka: Mitt's Bankrupt Solar Bet

Comment Now

Follow Comments

Konarka Technologies (Photo credit: Wikipedia)

Governments should not pick business winners and losers according to former Massachusetts Governor, W. Mitt Romney. Which Mitt was that? The one who criticized President Obama for backing Solyndra or the one who used $1.5 million in Massachusetts taxpayer money to back Konarka?

Last Friday, Konarka Technologies, a Lowell, Mass.-based solar technology company that got $1.5 million in state loans during Romney's governorship, liquidated itself through Chapter 7 bankruptcy.

Hypocritically enough, this did not stop Romney from holding a press conference in front of the Fremont, Calif. headquarters of Solyndra, a solar company that failed after getting $535 million in funds from the U.S., according to the *Boston Globe*.

Konarka appeared promising on the surface in January 2003 when Romney touted a plan to loan it $24 million from the state's renewable energy trust fund. Konarka claimed a Nobel Prize-winning co-founder and had raised more than $170 million in private capital investments and $20 million in government grants, according the *Globe*.

George W. Bush's administration gave Konarka a $1.6 million US Army contract in 2005 and $3.6 million from the Department of Energy in 2007. And President Obama included Konarka among 183 clean energy companies that got $2.3 billion in tax credits as part of the 2009 stimulus, reported the *Globe*.

Not surprisingly, Konarka's product could not compete. Its thin-film solar panels – called *Power Plastic* – were designed to charge electronic devices by sticking to the fabric of a messenger bag or a soldier's tent. The *Globe* reported in 2010 that *Power Plastic's* short life spans – at most five years – and its inefficient conversion of light into electricity — 3% to 4% — compared to traditional solar panels –15% to 20% – made the product a tough sell.

So it's not a big surprise that Konarka filed for bankruptcy and fired its 80 employees.

What is a little surprising to me is that Romney cites his business experience creating jobs as a reason to elect him President. I know from personal experience that his Bain Capital shunned start-up risk.

After all, in 1995 I presented a business plan to two of Romney's partners to develop an e-commerce business in a sector of the financial services industry. They rejected my idea and instead suggested that I help Bain Capital find existing companies that they could acquire.

The reason they gave for rejecting my idea? Too much start-up risk. I spent the next several months finding such companies and introduced them to a few. I found the Bain Capital partners to be very straightforward, smart, and professional.

I bring this up because I know Romney to be a person who is uncomfortable with start-up risk (and

not just the one I proposed) – when he agreed to run Bain Capital, Bill Bain promised Romney that he could return with honor to the consulting firm if the private equity start-up failed.

So I am surprised that Romney was willing to lend state money to Konarka. Moreover, given his reputation for analytical savvy, I would have expected him to see what a lousy investment solar cells are.

This is clear from doing a very basic job of industry analysis – something that Romney could not have escaped learning as a consultant and private equity firm runner. Industry analysis –detailing the forces that determine a market's profit potential — was made more sophisticated by Harvard Business School professor, Michael E. Porter, with whom I worked.

That analysis could have been done because all the factors were public knowledge in 2000 – three years before Romney backed Konarka. As I wrote last August, the basic lesson is that fast growth in an industry does not equate to high profitability. In 2000, the solar industry accounted for 175 megawatts worth of energy represented by the solar panels it produced. By 2010, the industry had grown to 16,000 megawatts at a compound annual growth rate of 57%.

But this rapid growth attracted competitors from China who were able to manufacture solar cells with far lower labor costs and they cut prices to gain market share.

These price cuts led to some nasty financial results for the now bankrupt, but formerly publicly-traded Evergreen Solar – another bad Massachusetts bet. In the first quarter of 2011, for example, Evergreen suffered from

- Shrinking revenue ($35.3 million, 60.4% below the previous quarter) and
- Declining shipments (17.8 megawatts, down 62% from the previous quarter),
- Negative gross margin of 63% meaning its prices were way below its costs,
- Falling prices (to $1.86 per watt down 2% from the quarter before), and
- Dwindling cash reserves ($31 million, down 49% in the quarter).

Was it reasonable to foresee the problems that the U.S. solar cell industry faces? Absolutely. Evergreen Solar's August 2000 initial public offering prospectus laid out the risks quite clearly.

How so? The company had lost money every year since its 1997 founding. 11 years before its bankruptcy filing, Evergreen Solar told investors, "We believe that there is a variety of competing solar power technologies under development by other companies that could result in lower manufacturing costs than those expected for our solar power products."

Since Konarka was privately held, all this industry information was not as readily available to the public as it must have been to Romney. But the lessons from government's foray into lending money to solar cell companies are clear:

- The government should generally avoid lending taxpayer money to start-ups because they do not have the cash flows to repay loans – they lose money for years developing a product that will likely either fail (high probability) or succeed wildly (tiny odds);
- If government insists on being a capital provider for businesses, it should at least do a much more thorough job of analyzing the industry and competitive position of the companies to which it lends; and
- Romney should consider skipping criticism of his opponent for doing something that he did himself – it weakens his credibility.

http://www.solarcurator.com/2012/06/08/konarka-snark-meets-pv-pipeline-exuberance/

Konarka-snark meets PV pipeline exuberance

Failed OPV company draws fire, anti-PV politricks, 3GWs of optimism

The Curator was in Austin most of this week, attending the 38th IEEE Photovoltaic Specialist Conference for the technical community's annual data dump and small-town-style networking. Although I fired off Tweets a-plenty from the event (with the requisite Tweature compilation coming soon), the Fresh Picks feature has been wanting, so here's a quick one on some recent content of note around the solar circuit.

The news of Konarka's descent into Chapter 7 bankruptcy (announced via Businesswire in classic bury-the-story fashion, late last Friday afternoon, June 1) drew the attention—and ire—of many media and analyst observers. Recommended reading includes Lux Research's concise, to-the-point commentary about the organic photovoltaics developer makes it clear that the company's failure (and failure it is—this ain't no Chapter 11 with hope of corporate redemption) had nothing to do with the current difficult market conditions and everything to do with the particularities of the company's technology and business plan. "Finding market success in emerging technologies takes many factors, but a viable technology underpins all of them, something that Konarka never had and no credible path to attain," says one particularly cogent excerpt.

https://gigaom.com/2012/06/01/solar-thin-film-maker-konarka-files-for-bankruptcy/

Konarka Technologies, a maker of organic solar thin films, said Friday it's going bankrupt, an announcement that may not be so surprising to many who have watched and waited for the venture-backed company to try to build a viable business.

Konarka Technologies, a maker of organic solar thin films, said Friday it's going bankrupt, an announcement that may not be so surprising to many who have watched and waited for the venture-backed company to try to build a viable business.

The Massachusetts company filed for Chapter 7 and plans to liquidate its assets to pay back creditors. The company developed organic thin films that it wanted to see installed as part of building façades, and despite raising close to $200 million by our last count, it struggled to find success.

The fact that Konarka, founded in 2001, has lasted this long has been puzzling to some. The low efficiency of organic thin films – the company was selling products that could convert only a few percent of the sunlight that falls on them into electricity as of last year – and the difficulties of finding buyers in the building design and construction market have been persistent challenges for Konarka over the years.

Konarka's technology used a photo-reactive material printed onto plastic, and they are quite different from the silicon or cadmium-telluride semiconductors used in conventional solar cells

today. Instead of encasing the films in glass like other solar panels on the market, Konarka makes its films in protective polymer layers so that they are flexible.

“Konarka has been unable to obtain additional financing, and given its current financial condition, it is unable to continue operations. This is a tragedy for Konarka’s shareholders and employees and for the development of alternative energy in the United States,” said Howard Berke, chairman and CEO of Konarka, in a statement.

Konarka was able to sell its organic thin films for lining umbrellas and shoulder bags, but it wasn’t clear whether these sales and shipments amounted to any significant volumes. Konarka marketed its thin films to architects and builders in the building-integrated photovoltaic (BIPV) market, which has barely emerged and is a tough market to crack. Architects like the idea of adding eco-friendly features, but they tend to balk at the added expense and worry about the logistics of embedding, operating and replacing electrical equipment that isn’t likely to last as long as the buildings. The lackluster housing market in the past few years also hasn’t helped.

In 2010, the company raised $20 million from Konica Minolta, which wanted build a manufacturing joint venture in Japan. Konarka had lined up many other investors, too, including Draper Fisher Jurvetson, Good Energies, 3i, Mackenzie Financial Corp., Pegasus Capital, Asenqua Ventures, New Enterprise Associates , Vanguard Ventures, Chevron Ventures, Massachusetts Green Energy Fund, NGEN Partners, Angeleno Group and Total, the French oil and gas giant who invested $45 million in 2008.

http://www.businesswire.com/news/home/20081007005342/en/Konarka-Opens-Worlds-Largest-Roll-to-Roll-Thin-Film#.VELYkqTwthE

October 07, 2008 10:00 AM Eastern Daylight Time

LOWELL, Mass.--(BUSINESS WIRE)--Konarka Technologies, Inc., an innovator in development and commercialization of Power Plastic®, a material that converts light to energy, today announced the company has opened the largest roll-to-roll flexible thin film solar manufacturing facility in the world, preparing for the commercialization and mass production of its patent-protected thin film solar material, Power Plastic. Located in New Bedford, Massachusetts, the 250,000 square foot building was previously the location for Polaroid Corporation’s most advanced printing technologies.

“This facility has state-of-the-art printing capabilities that are ready for full operation, with the future potential to produce over a gigawatt of flexible plastic solar modules per year,” commented Howard Berke, executive chairman and co-founder of Konarka. “Our technical leadership and innovation in flexible thin film solar, along with this facility’s capabilities of producing in excess of 10 million square meters of material per year, will allow us to produce Power Plastic for indoor, portable, outdoor and building integrated applications.”

With this U.S. based manufacturing location, Konarka further expands its presence in Massachusetts and accelerates its aggressive plans to develop and commercialize its polymer-based organic photovoltaic (OPV) technologies worldwide. In addition to acquiring the fully automated roll-to-roll manufacturing line, the company has also hired the leading technology and process engineering teams from Polaroid, with plans to hire over 100 additional employees as production increases toward capacity over the next two to three years.

Konarka's advanced photovoltaic technology started with the work of the late Dr. Sukant Tripathy, an internationally known polymer materials scientist, provost at UMASS Lowell and founder of the Plastic Innovation Center and Dr. Alan Heeger, Konarka's chief scientist, who was awarded the Nobel Prize in chemistry in 2000. The ground-breaking discoveries from both founding scientists led to Konarka's underlying technology leadership, including a manufacturing process at relatively low temperatures, which enables the use of low-cost plastic substrate films. As a result of these pioneering innovations, the company has secured over $100 million from leading venture capital and private equity funds, as well as $18 million in government agency research grants from the U.S. and Europe.

"Since 2001, Konarka has taken revolutionary lab discoveries from its founding scientists to pilot production for initial customers and now to full-scale manufacturing with the near future capacity of one gigawatt per year, which could contribute to the power and electricity needs of our nation and the avoidance of CO_2 emissions," commented Rick Hess, president and CEO at Konarka**.** "As one of the original recipients of the Solar American Initiative (SAI) awards in 2007, Konarka is furthering the U.S. Department of Energy's (DOE) vision to reach its goal of making solar electricity from photovoltaics cost-competitive with conventional forms of electricity."

In addition to global and national interest, the project has been assisted by various Massachusetts departments and quasi-public agencies, including the Massachusetts Governor's Office, the Executive Office of Housing and Economic Development, the Executive Office of Energy and Environmental Affairs, MassDevelopment and the Massachusetts Technology Collaborative's Renewable Energy Trust Fund and Green Energy Fund.

"With our nationally recognized technology expertise and resources, Massachusetts is becoming a global center for alternative and renewable energy, and Konarka is helping to solidify our commitment to a clean energy future and ongoing economic development and job growth in the Commonwealth," commented, Daniel O'Connell, Massachusetts Secretary of Housing and Economic Development.

The company has also partnered with the City of New Bedford to become a Certified Project under the Massachusetts Economic Development Incentive Program (EDIP). Under the EDIP, Certified Projects receive favorable state and local tax treatment in exchange for committing to certain job creation and private investment criteria. The EDIP is designed to increase economic activity within the Commonwealth's identified Economic Target Areas (ETAs) and the City of New Bedford has historically utilized the EDIP as one of its key economic development planning tools.

Scott W. Lang, Mayor of New Bedford, added, “We are excited that Konarka is bringing new jobs to help further drive the economy and interest in the city of New Bedford, and we are proud that our city is home once again to an industry leading manufacturing plant.”

Constructed and further expanded in the 1990’s for Polaroid’s advanced technology development and large-scale manufacturing, Konarka’s New Bedford facility has been retrofitted to immediately begin initial production of Power Plastic. Using multiple in-line processing stations with precision multi-layer manufacturing processes that are adaptable to a variety of printing and coating technologies, the facility will enable the company to further develop and advance nano-enabled polymer photovoltaic materials that are lightweight, flexible and more versatile than traditional solar materials.

NOTE TO EDITORS/PRODUCERS: Photographs and B-Roll footage are available upon request.

About Konarka Technologies, Inc.

Konarka develops and manufactures solar plastic films that convert light to energy – anywhere. As the leading developer of polymer-based, organic photovoltaic (OPV) technology that provide a source of renewable power in a variety of form factors, Konarka has a broad portfolio of patents, technology licenses and an accomplished technical, scientific and manufacturing team. Manufactured at low cost and low energy consumption, the company's Power Plastic® technology is lightweight, flexible, scalable and adaptable for use in a variety of commercial, industrial, government and consumer applications. Konarka Technologies is headquartered in Lowell, Mass., U.S.A. and has a full scale production manufacturing facility in New Bedford, Mass. U.S.A., with European headquarters in Nuremberg, Germany, business development offices in Asia and a research and development facility in Austria. For additional information, visit http://www.konarka.com.

https://www.bizjournals.com/boston/stories/2003/07/28/smallb1.html

By Mark Micheli – Journal Staff
Jul 28, 2003, 12:00am EDT **Updated** Jul 24, 2003, 12:16pm EDT

LOWELL -- During the United States' industrial revolution near the turn of the 20th century, workers made fabric in the old Boott Cotton Mill in downtown Lowell. Now workers there are making a "fabric" for the 21st century, according to Paul Wormser, chief product marketing officer for Konarka Technologies Inc.

And it's a fabric that holds promise to revolutionize the solar energy industry.

Wormser is focused and intense as he holds out a roll of plastic, about five inches wide with purple lines running through it. He explains that the company is

defining third-generation solar cell technology with this thin plastic that is coated with a dye-sensitized material that can absorb light. He bends it to show how flexible it is, like cloth, and explains that -- unlike the hard solar panels of silicon that are sold today -- this product works both inside with artificial light and outside, and can be produced much more cheaply.

Cost is what will revolutionize the industry, according to Lisa Frantzis, director of renewable and distributable energy at Navigant Consulting Inc. in Burlington, who has been following the industry for more than 20 years. The goal is to get solar energy costs down to the level of traditional fossil fuels, and then the industry won't have to rely on government subsidies to sustain itself. Frantzis says she believes the industry is heading in that direction, noting that costs today are about one-tenth what they were in the 1980s.

Konarka hopes to take the industry one step closer to that cost-efficiency goal when it starts building products for the marketplace in the second half of next year. Wormser says the first market for Konarka's solar cells will be small, battery-operated electronic devices, such as radios and camping lanterns. Someday, Wormser says, they hope to bring electric power to people in Third World countries that don't have it. And beyond that, Konarka may one day be able create solar panels for roofs that will look just like roof shingles.

"We are in preproduction, the phase of taking the technology from laboratory to market," explains Konarka president and CEO William M. Beckenbaugh.

Beckenbaugh, a former Sanmina-SCI and Motorola vice president, notes that the company has grown from the days of its founding researcher, the late Dr. Sukant K. Tripathy (who died in a swimming accident in Hawaii in 2001), and his students. It has grown to 32 employees in the past 18 months. About half of those employees came from Polaroid Corp., according Wormser, who notes that the company uses some of the same machines Polaroid uses to make film.

"And it's an easier job here, because we use less chemicals and can do our work in the light," Wormser says with a laugh.

The initial research for this technology was funded by the U.S. Army, which was looking for a lightweight solution for supplying troops with power out in the field. The company still is working with some of that funding and hopes to one day be able to sell products to the military. In total, the company has received about $18 million in funding, which includes venture capital led by Draper Fisher Jurvetson, according to Beckenbaugh.

Beckenbaugh, who was hired a year ago this month, says the company will continue to hire people as it enters the early-production phase, which it expects to do by mid-2004. And he notes that the company is searching northern Massachusetts for about 20,000 square feet of manufacturing space, which it anticipates it will need in 2005.

He explains that Konarka will keep its current offices and laboratory space at the Boott Mill and will do the production work elsewhere.

Both Beckenbaugh and Wormser say they believe the company is ahead of the few other companies trying to redefine the solar industry with a third-generation product.

"When we started the company, we were just about the only one out there," Beckenbaugh says. "In the last few months, we've seen several California companies created to exploit this market."

Beckenbaugh notes that the company is also working on another technology, which has the potential to be even cheaper and simpler to manufacture. That technology was developed and patented by Quantum Solar Energy Linz (QSEL), an Austrian company that Konarka bought for an undisclosed sum in February.

Frantzis says that some major corporations, such as Shell and Sanyo, have also been getting into the solar business because they recognize it is a large, growing market. She says that revenue in 2002 from installed solar systems worldwide was $4.3 billion.

The big power companies recognize that solar energy could be a future threat to the fossil fuel industry, she said, and that being involved in it is also a good public relations move for them. Ultimately, the big players could be a threat to the smaller players, she added.

IEEE Spectrum

https://spectrum.ieee.org/energy/renewables/can-organics-replace-silicon-in-pv

On a Roll: Konarka has found a way to put Grätzel cells on a cheap, light, flexible plastic that can be printed roll-to-roll.

The military's push into organic PV began four years ago at the Natick center, which is to the U.S. foot soldier what Q is to James Bond at MI6. In 2000, Natick teamed up with chemists at the University of Massachusetts Lowell, who were working on Grätzel cells, a form of organic PV named for Michael Grätzel of the Swiss Federal Institute of Technology in Lausanne. (Grätzel invented the cells 12 years ago; the team at Lowell had been assembled by the late Sukant K. Tripathy, a talented chemist who developed a process for attaching particles of titania--titanium dioxide--to plastic.) Grätzel cells mimic photosynthesis: light-sensitive organic dyes dissolved in an electrolyte absorb light and transfer energized electrons to titania nanocrystals sintered to an electrode-coated substrate.

By 1994, the best Grätzel cells generated power at 10 percent efficiency--rivaling the best commercial solar panels of the time--yet the technology languished because the liquid electrolytes were sensitive to heat and prone to leakage. For Samuelson and her colleagues at

Natick, Grätzel cells had a final, fatal flaw: assembled on glass plates that could withstand the titania-sintering step at 450 š C, they were hardly appropriate for a backpack.

But over the last four years, the University of Massachusetts team, since spun off in Lowell as Konarka Technologies Inc., has addressed each flaw, and this winter it hopes to complete its first military prototypes. Konarka plans to begin selling modules by mid-2005, and with US $13.5 million in venture capital and such business partners as Eastman Chemical Co. in Kingsport, Tenn., and utility giant Electricité de France, they appear to have the resources to get there.

Konarka worked with Grätzel to develop heat-stable gel-based electrolytes, whose viscosity makes them more leakproof than liquids, and a tighter sealing material to keep the electrolyte fixed. "You can take these cells and cut them in half, and they still work," Samuelson says.

Most important, Konarka found a way to produce the cells on cheap, light, and flexible sheets of poly-ethylene terephthalate (the clear plastic of soda bottle fame) in a continuous process [see photo, "On a Roll"]. Titania particles 20-30 nm in diameter are sintered onto stainless steel or titanium foil in 1- to 2-cm-wide strips, which are then laminated onto the plastic sheet, covered with electrolyte, and capped with an electrode-coated top sheet of plastic.

According to Konarka's vice president for R and D, Russell Gaudiana, modules assembled from these cells will weigh one-third as much as the lightest flexible photovoltaics available today, which employ amorphous silicon on heat-resistant engineering polymers (those with the qualities needed to replace metals) and cost half as much to produce, at under $1 per watt. Their output could also be higher: Gaudiana says large cells rolling off its coating machines convert 6.8 percent of incident solar energy into electricity, matching the best amorphous silicon products, and could eventually achieve 16 percent. Samuelson deems Konarka's current performance "very usable" for military applications.

Of course, modules that convert more light into electricity would deliver more bang for the buck--and kilo--and that's what Darpa's program is seeking to gain from another family of organic photovoltaics: nanocomposite cells. These cells are analogous to theorganic light-emitting diodes now entering the display market [see "The Dawn of Organic Electronics," IEEE Spectrum, August 2000,pp. 29-34]; they employ mixtures of organic dyes, polymers, and nanostructures that mimic the light-absorbing pn junction of inorganic photovoltaics.

'We're starting to make prototype devices to try out in the field....You can take these cells and cut them in half, and they still work'

First reported by Kodak researchers in 1986, these pn mimics were stuck at a paltry 1 percent conversion efficiency until 2000. Since then, hybrids incorporating inorganic and organic nanomaterials have been found to conduct better and have achieved power conversion of better than 3.5 percent.

Like the Grätzel cells, these layered organic and nanocomposite cells are amenable to low-cost processing. Many can be assembled layer by layer with simple spray-coating techniques. Darpa thinks nanocomposite organics are poised for a step change: its goal is to push efficiency to 20 percent over five years. As many as 30 or 40 teams are rumored to be bidding for Darpa's dollars, and if the proposals pass muster, two to four of them could be off and running within months with $5 million to $10 million each--providing a major boost for the field.

Top experts and players in organic electronics are optimistic. "Today's efficiency numbers are not the end point by any stretch of the imagination," says Stephen Forrest, a physicist at Princeton University in New Jersey and a pioneer in the field. Already, "we're far beyond what's been published," says Stephen Empedocles, director of business development for the start-up Nanosys Inc., in Palo Alto, Calif.

But will low-cost organic PV ever crack the most price-sensitive market of all: rooftop panels? Today's rooftop installations are warranted to operate through 20-30 years of environmental abuse, and that's a high bar for organic electronics, which tend to be less stable than inorganic semiconductors. Several decades of warranted performance is a "tremendous requirement," says Franz Karg, global head of R and D for PV producer Shell Solar, an Amsterdam subsidiary of the Royal Dutch/Shell Group in The Hague. "Frankly, I don't expect this performance in the next 10 to 15 years from organics, if it's possible at all." Nanosys and Matsushita insist they can deliver that performance by 2007.

https://www.cnet.com/news/konarka-touts-gains-on-niche-y-flexible-solar-cells/

Konarka said today that it has achieved a record in organic solar cell efficiency but its products are still seeking a viable commercial niche.

The Lowell, Mass.-based company said the National Renewable Energy Laboratory has certified that Konarka's plastic solar cells have achieved an efficiency of 8.3 percent, the highest that NREL has recorded for organic photovoltaic cells.

Founded in 2001, Konarka has a facility to make flexible solar cells using plastic in a roll-to-roll manufacturing process. It's one of a handful of companies pursuing organic photovoltaics and other so-called third-generation solar cell technologies, which also include dye-sensitized cells.

Thin-film organic photovoltaic cells are cheaper than other solar cell technologies because of the material that's used. But the efficiency has limited their potential applications to areas such as embedded solar cells in buildings or portable solar chargers for electronic gadgets.

https://www.businesswire.com/news/home/20120601006015/en/Konarka-Technologies-Files-Chapter-7-Bankruptcy-Protection

- June 01, 2012 05:10 PM Eastern Daylight Time
- LOWELL, Mass.--(BUSINESS WIRE)--Konarka Technologies, Inc., a leading developer of thin-film solar panels, has filed for bankruptcy protection under chapter 7 of the Federal bankruptcy laws. Under chapter 7 proceedings, the company's operations cease and a trustee is tasked with liquidating the company's assets for the benefit of creditors. Creditors will be asked to submit their claims to the Bankruptcy Court and are unable to obtain payment from the company.
- Howard Berke, chairman, president and CEO of Konarka, said, "Konarka has been unable to obtain additional financing, and given its current financial condition, it is unable to continue operations. This is a tragedy for Konarka's shareholders and employees and for the development of alternative energy in the United States."
- Konarka was founded by Mr. Berke and by Dr. Alan Heeger, the winner of the Nobel Prize for his work in conductive polymers. Among the Company's assets are over hundreds of owned and licensed patents and patent applications in the field of solar energy and a state-of-the-art manufacturing plant in New Bedford, Massachusetts.
- Mr. Berke noted that several large international companies had expressed interest in financing or acquiring the company. He further noted that, given the worldwide interest in the company, including from the Chinese government, the company had not entirely given up hope that a rescue financing or acquisition would emerge in the bankruptcy. Under Chapter 7 proceedings, however, any such transactions are evaluated by a trustee and not by the company itself.
- Further information about the company, including a copy of its petition in bankruptcy, is contained on Konarka's website, www.konarka.com.

  – https://www.businesswire.com/news/home/20120601006015/en/Konarka-Technologies-Files-Chapter-7-Bankruptcy-Protection